BRITISH STANDARD

BS 4116 :
Part 4 : 1992

Conveyor chains, their attachments and associated chain wheels

Part 4. Specification for chains and attachments (British series)

BSi
British Standards

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Machinery and Components Standards Policy Committee (MCE/-) to Technical Committee MCE/1, upon which the following bodies were represented:

British Industrial Truck Association
Institution of Mechanical Engineers
Mechanical Handling Engineers' Association
Precision Chain Manufacturers' Association

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The following BSI references relate to the work on this standard:
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Contents

Foreword

This Part of BS 4116 has been prepared under the direction of the Machinery and Components Standards Policy Committee.

The requirements specified in this Part of BS 4116 have been prepared to meet the needs of the current UK market and reflect the continued popularity of the original UK designs of roller conveyor chains and attachments. Although primarily meeting a specific need in the UK, this Part of BS 4116 will also be a useful point of reference for the substantial markets that still exist for these chains in Europe and Commonwealth countries.

The following Parts of BS 4116 are in preparation:

Part 1. Specification for chains (metric series)

Part 2. Specification for chain wheels

Part 3. Specification for attachments (metric series)

It is envisaged that BS 4116 : Parts 1, 2 and 3 will be identical with ISO 1977-1 : 1976, ISO 1977-2 : 1974 and ISO 1977-3 : 1974, published by the International Organization for Standardization (ISO).

BS 4116 : Parts 1 to 4 will specify requirements for a complete range covering the most popular conveyor chains, chain wheels and attachments in current use, and will supersede BS 4116 : 1971. It is intended that when Parts 1 to 4 have been published BS 4116 : 1971 will be withdrawn.

Chain wheels manufactured in accordance with BS 4116 : Part 2 will be suitable for use with conveyor chains manufactured in accordance with this Part of BS 4116.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Specification

1 Scope

This Part of BS 4116 designates identity numbers and specifies dimensional requirements and tensile strengths for a range of conveyor chains and attachments. It also specifies requirements for the following alternative types of construction:

(a) hollow and solid bearing pins;

(b) plain and flanged rollers;

(c) deep link plate versions;

(d) K1, K2 and K3 attachments.

The chains and attachments are suitable for a wide range of uses in mechanical handling of bulk materials and/or unit loads. The tensile strengths of the chains range from 13 kN to 750 kN.

2 Definition

For the purposes of this Part of BS 4116, the following definition applies.

tensile strength

That test value which is to be exceeded when a tensile force is applied to a sample chain being tested to destruction.

NOTE. The tensile strength is not a working value but is intended to be used to compare chains produced by various manufacturers. Actual application information should be available from chain manufacturers or their published data.

3 Conveyor chains

3.1 Nomenclature

The nomenclature used to identify chain assemblies and their component parts shall be as illustrated in figure 1.

NOTE. The figure does not purport to define the actual form of the chain plates.

3.2 Chain designation

The chains shall be designated by an alphanumeric reference constructed as follows:

(a) a first digit '1' to '8' to denote the numerical part of the chain number listed in table 1;

(b) a second letter, to denote the bearing pin construction, i.e.

'S' for solid,

'H' for hollow;

(c) a third, fourth and fifth digit, to denote the tensile strength of the chain specified in table 1 (see note);

(d) a sixth letter, to denote the roller design, i.e.

'P' for plain projecting roller,

'F' for flanged roller,

'S' for small roller,

'B' for rollerless (or bush); (see dimensions d_1, d_1, d_7 and d_4 respectively in table 1);

(e) the remaining digits, to denote the chain pitch, i.e.

in units of $\frac{1}{4}$ in; or

in units of 1 mm followed by letter 'M'.

NOTE. Where the tensile strength consists of only two digits, then the third digit of the chain designation is to be a zero.

Example

A series 3 chain with solid bearing pins, having a tensile strength of 33 kN, fitted with plain projecting rollers and with a pitch of 3.0 in would be designated as '3S033P12'.

3.3 Dimensions

Dimensions of chains shall be as given in table 1 (illustrated in figure 2) and the pitches shall be as listed in table 2.

NOTE. The maximum and minimum dimensions specified in table 1 represent limits which permit interchangeability of chains manufactured by different manufacturers on the same chain wheels and are not the actual tolerances that should be used in manufacture.

3.4 Tensile test

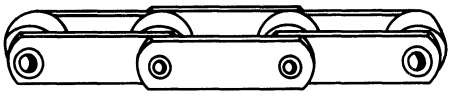
A tensile force shall be applied slowly to the ends of a chain sample, consisting of at least three free pitches, by means of shackles permitting free movement on both sides of the chain centre line in the normal plane of articulation.

The chain shall resist a force equivalent to the tensile strength given in table 1 without failure. Failure shall be considered as having occurred at the first point where increasing extension is no longer accompanied by increasing force, i.e. the summit of the force/extension graph.

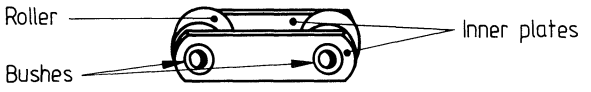
Tests in which failures occur adjacent to the shackles shall be disregarded.

NOTE. Even if the sample does not visibly fail when subjected to this test it may have been stressed beyond the yield point and be unfit for service.

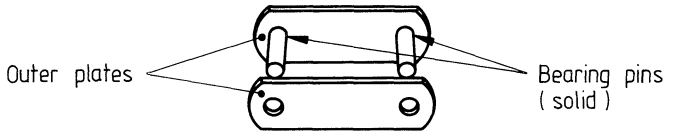
(a) Solid bearing pin chain



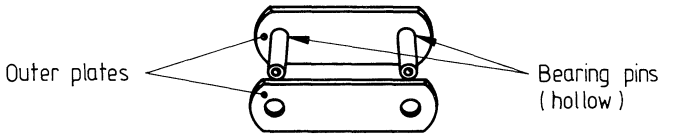
(b) Hollow bearing pin chain



(c) Inner link

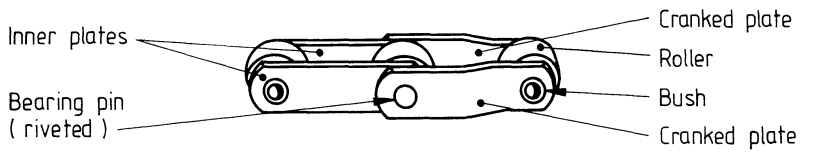


(d) Outer link (solid bearing pins)

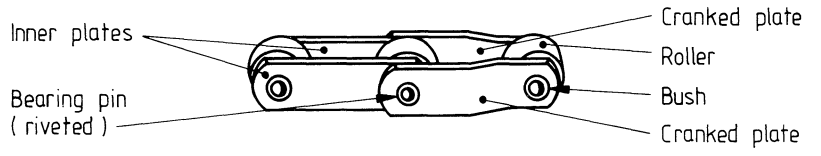


(e) Outer link (hollow bearing pins)

(f) Connecting link



(g) Cranked link double (solid bearing pin)



(h) Cranked link double (hollow bearing pin)

Figure 1. Nomenclature of chains

Table 1. Chain data

Chain number	Tensile strength		Bearing area	Hollow bearing pin bore d_6 min.	Bearing pin body dia. d_2 max.	Bush bore d_3 min.	Bush dia. d_4 max.	Plate depth h_2 max.	Width between inner plates b_1 min.	Width over inner link b_2 max.	Width between outer plates b_3 min.	Width over bearing pins b_4 max.	Additional width for joint fastener[1] b_7 max.	Plain projecting roller dia.[2] d_1 max.	Flanged roller			Small roller dia.[2] d_7 max.	Deep link[4] h_6 nom.	Measuring force
	Normal min.	Enhanced min.													Tread dia.[2] d_1 max.	Flange dia.[3] d_5 max.	Flange width b_{11} max.			
	kN	kN	mm^2	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kN
1S	13	—	90	—	5.72	5.77	12.1[5]	18.5	11.5	15.7	15.9	22.0	6.0	25.6	—	—	—	18.0	16.0	0.26
2H	20	—	160	6.5	9.6	9.65	12.2	19.5	12.5	17.4	17.6	24.7	2.0	25.6	—	—	—	19.5	—	0.40
3H	27	50	350	10.1	14.0	14.2	18.2	27.0	15.0	25.1	25.5	38.0	11.0	32.0	32.0	41.5	3.5	25.5	26.0	0.54
3S	33	65	350	—	14.0	14.2	18.2	27.0	15.0	25.1	25.5	39.0	11.0	32.0	32.0	41.5	3.5	25.5	26.0	0.54
4H	54	100	600	13.1	19.1	19.3	23. 8	41.0	19.0	31.8	32.3	45.0	14.0	48.0	48.0	61.0	4.5	38.5	32.0	1.08
4S	67	130	600	—	19.1	19.3	23.8	41.0	19.0	31.8	32.3	47.0	14.0	48.0	48.0	61.0	4.5	38.5	32.0	1.08
5H	107	210	1100	20.1	27.0	27.2	33.3	52.5	25.0	42.2	42.7	59.0	16.0	67.0	67.0	86.0	7.0	— [6]	45.0	2.14
5S	134	265	1100	—	27.0	27.2	33.3	52.5	25.0	42.2	42.7	62.0	16.0	67.0	67.0	86.0	7.0	— [6]	45.0	2.14
6H	160	—	1800	23.1	31.8	32.0	38.2	66.0	38.0	58.5	59.0	80.0	21.0	89.0	89.0	115.0	9.0	— [6]	— [6]	3.20
6S	200	—	1800	—	31.8	32.0	38.2	66.0	38.0	58.5	59.0	83.0	21.0	89.0	89.0	115.0	9.0	— [6]	— [6]	3.20
7S	267	—	1300	—	23.1	23.3	38.2	66.0	38.0	58.5	59.0	83.0	17.0	89.0	89.0	115.0	9.0	— [6]	— [6]	5.34
8S[7]	400	750	1900	—	29.4	29.6	38.2	66.0	38.0	65.6	66.1	95.0	22.0	89.0	89.0	115.0	9.0	— [6]	— [6]	8.00

[1] Except for chain number 2H, all connecting links use solid pins.

[2] Permissible variation + 0.0, − 0.5 mm.

[3] Permissible variation + 0.0, − 2.0 mm.

[4] See **4.5**.

[5] Small roller diameter, bush chain not normally used.

[6] See individual manufacturers' catalogues.

[7] The enhanced version has increased dimensions as follows:
b_2 = 70.5 mm
b_3 = 71 mm
b_4 = 105 mm

blank

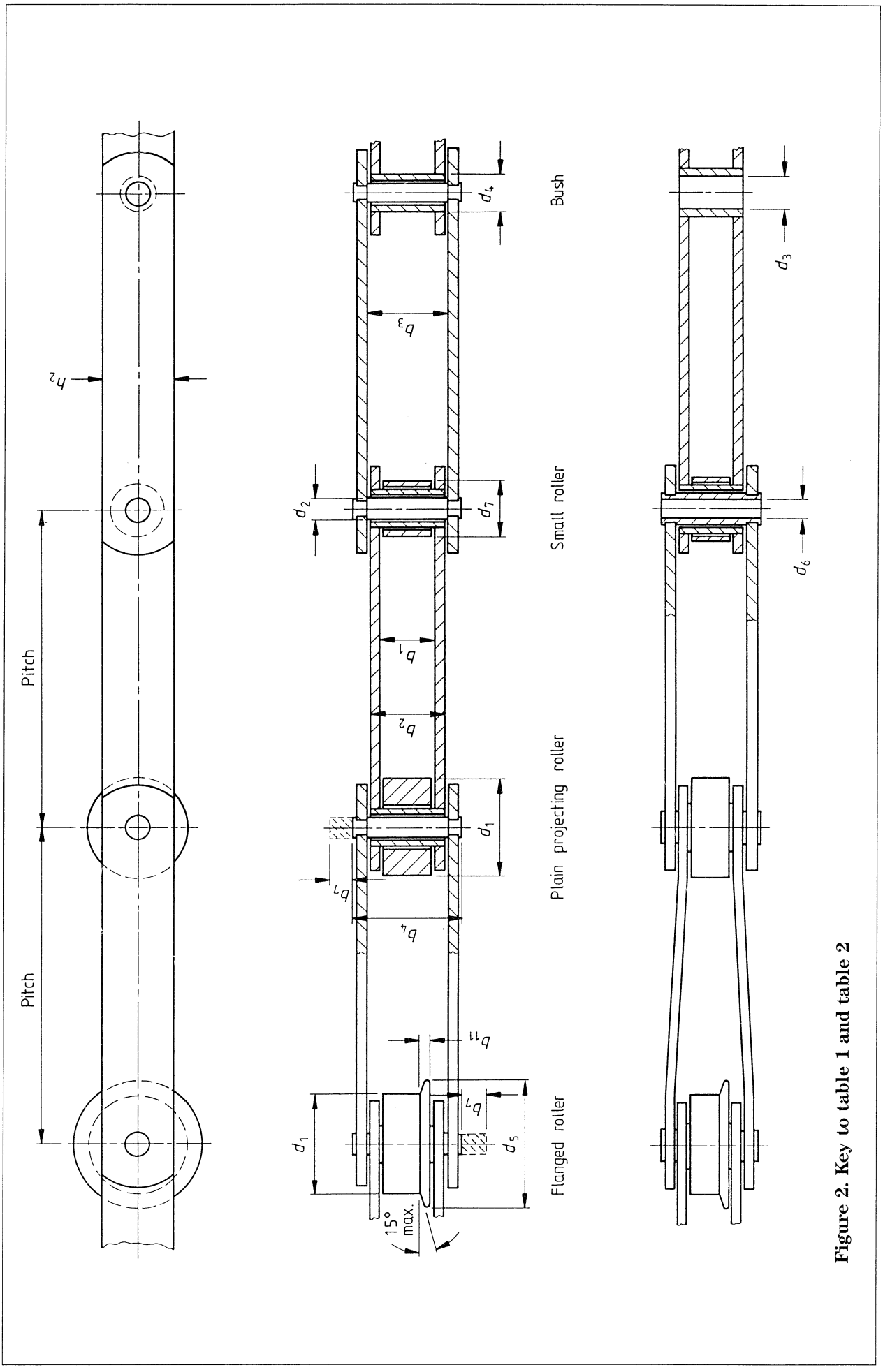


Figure 2. Key to table 1 and table 2

Table 2. Standard chain pitches in millimetres (inches)

Chain number	38.1 (1.50)	50.8 (2.0)	63.5 (2.50)	76.2 (3.0)	101.6 (4.0)	127.0 (5.0)	152.4 (6.0)	203.2 (8.0)	228.6 (9.0)	304.8 (12.0)
1S	×	×	×	×	×					
2H	×	×	×	×						
3H/3S		×		×	×	×	×			
4H/4S				×	×	×	×	×	×	
5H/5S					×	×	×	×	×	×
6H/6S							×	×	×	×
7S							×		×	×
8S							×		×	×

NOTE. Non-standard pitch chains may also be available.

3.5 Length accuracy

Finished chains shall be measured for length accuracy after assembly and/or riveting but prior to the application of lubrication.

A sample of chain commencing and finishing at an inner link and approximately 3 m in length shall be selected and subjected to the measuring force given in table 1 whilst fully supported along its length.

The average pitch of all links shall be $+0.08$, -0.12 % of the nominal pitch of the chain.

3.6 Marking

The chains shall be marked with the manufacturers' name or trade mark.

4 Attachments

4.1 General

Except where otherwise stated in **4.2, 4.3** and **4.4**, the characteristics, dimensions and tests for chains with attachments shall be as specified in clause **3.**

4.2 Attachment designation

Attachments shall be identified by the following designations and distinguishing features (see figure 3):

(a) K1 with one attachment hole centrally disposed in each platform;

(b) K2 with two attachment holes longitudinally disposed;

(c) K3 with three attachment holes longitudinally disposed; the centre hole being centrally disposed in each platform.

4.3 Manufacture

The attachments shall be either attached to the chain plates or integral with the chain plates, the form being left to the discretion of the manufacturer provided that the platform length will accommodate the attachment holes and will not interfere with the articulation of adjacent plates.

NOTE. Attachments may be incorporated on one or both sides of the chain and be spaced along the chain length to suit the application of the chain.

4.4 Attachment dimensions

Dimensions of attachments shall be as given in table 3 and illustrated in figure 3.

4.5 Deep link plate chain dimensions

The depth h_6 of deep link plate chains shall be as given in table 1 and illustrated in figure 4.

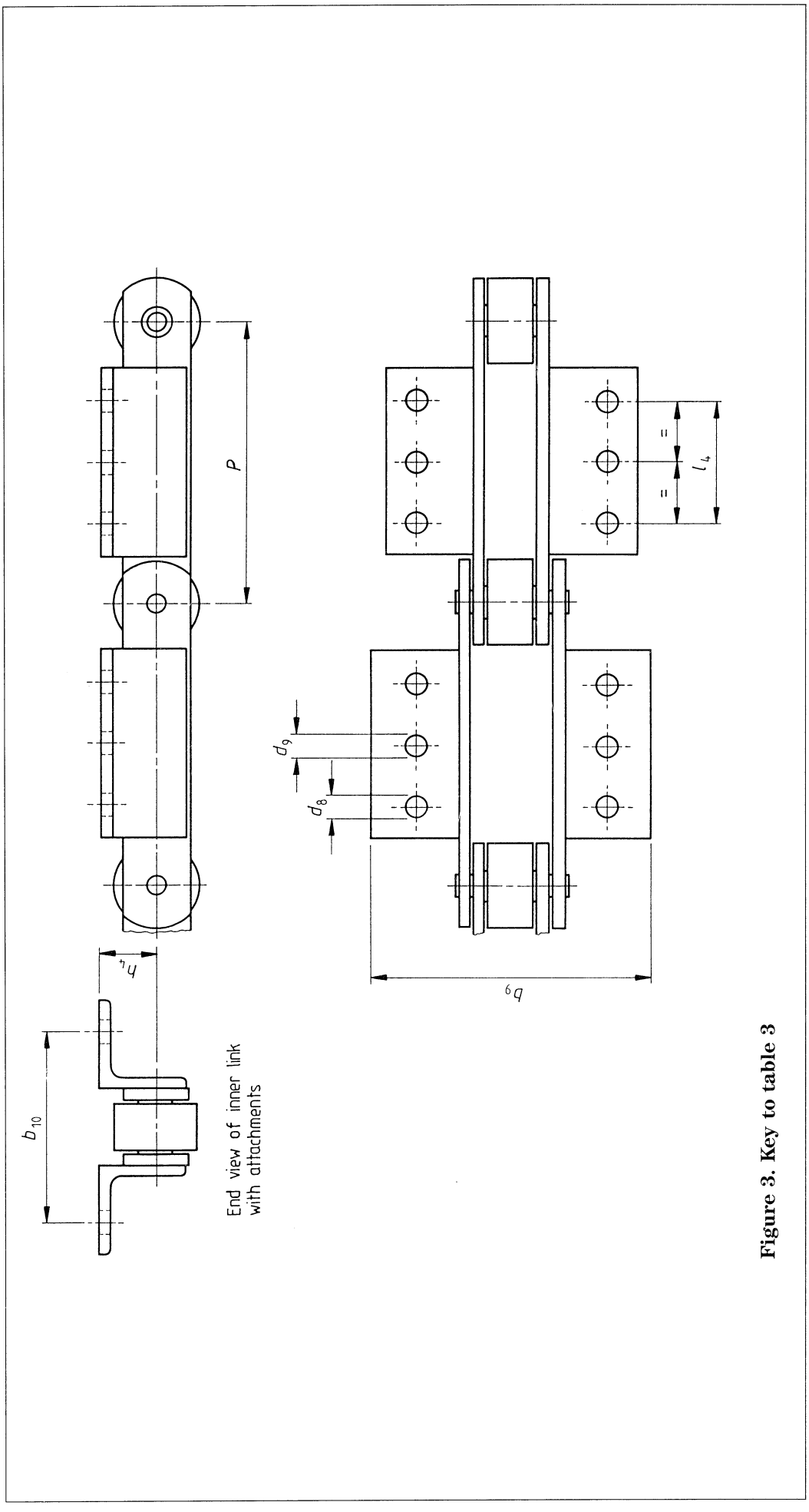


Figure 3. Key to table 3

Table 3. K attachment dimensions[1)]

Chain number	Platform height h_4 nom.	Transverse pitch b_{10} nom.	Width over attachment b_9 max.	Chain pitch P	K1	K2		K3		
					Centre hole dia. d_9 min.	Outer holes dia. d_8 min.	Hole pitch l_4 nom.	Centre hole dia. d_9 min.	Outer holes dia. d_8 min.	Hole pitch l_4 nom.
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1S	16.5	44.5	74.0	38.1	9.2	—	—	—	—	—
				50.8	8.2	—	—	9.2	7.4	25.4
				63.5	8.2	7.4	22.2	—	—	—
				76.2	8.2	7.4	25.4	9.2	7.4	25.4
				101.6	8.2	7.4	25.4	9.2	7.4	25.4
3H and 3S	19.0	76.2	118.0	50.8	10.5	9.2	22.2	—	—	—
				76.2	10.5	9.2	22.2	10.5	9.2	22.2
				101.6	10.5	9.2	31.8	10.5	9.2	31.8
				127.0	10.5	9.2	57.2	10.5	9.2	57.2
				152.4	10.5	9.2	57.2	10.5	9.2	57.2
4H and 4S	31.8	89.0	138.0	76.2	13.7	—	—	13.7	10.5	31.8
				101.6	13.7	10.5	31.8	13.7	10.5	31.8
				127.0	13.7	10.5	31.8	—	—	—
				152.4	13.7	10.5	57.2	13.7	10.5	57.2
				203.2	13.7	10.5	89.0	—	—	—
				228.6	13.7	10.5	89.0	—	—	—
5H and 5S	38.0	108.0	178.0	101.6	15.3	12.2	31.8	—	—	—
				127.0	15.3	12.2	31.8	—	—	—
				152.4	15.3	12.2	57.2	15.3	12.2	57.2
				203.2	15.3	12.2	89.0	—	—	—
				228.6	15.3	12.2	133.4	—	—	—
				304.8	15.3	12.2	133.4	—	—	—
6H and 6S	51.0	146.0	201.0	152.4	16.9	13.7	38.1	—	—	—
				203.2	16.9	13.7	89.0	—	—	—
				228.6	16.9	13.7	89.0	—	—	—
				304.8	16.9	13.7	165.1	—	—	—
7S	51.0	146.0	201.0	152.4	16.9	13.7	38.1	—	—	—
				228.6	16.9	13.7	89.0	—	—	—
				304.8	16.9	13.7	165.1	—	—	—
8S	57.0	171.5	252.0	152.4	19.5	—	—	—	—	—
				228.6	19.5	19.5	89.0	—	—	—
				304.8	—	19.5	165.1	—	—	—

[1)] Other combinations of attachment types and/or pitches may also be available.

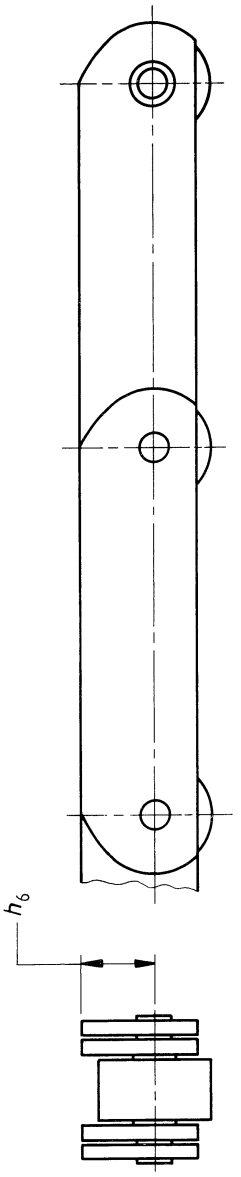


Figure 4. Deep link plate chain

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